

## NEW RESULTS ON HELIUM AND TRITIUM GAS PRODUCTION FROM TERNARY FISSION

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In the fission process, the two heavy fragments are accompanied by a Light Charged Particle (LCP) roughly two to four times every thousand events. These particles constitute an important source of helium and tritium production in nuclear reactors. Data concerning this production are requested by nuclear safety specialists and also by physicists in order to improve our understanding of the LCP emission process and to infer information related to the fission process itself.

In the present paper, we report results obtained from various campaigns of measurements performed in order to enlarge the database related to the  $^4\text{He}$  and  $^3\text{H}$  emission probabilities. These measurements concern both thermal neutron induced fission reactions as well as spontaneous fission decays. For spontaneous fission, data are reported for nuclides ranging from  $^{238}\text{Pu}$  up to  $^{252}\text{Cf}$ . For neutron induced fission, results cover target nuclei between  $^{229}\text{Th}$  and  $^{251}\text{Cf}$ .

Based on these and other results, new semi-empirical relations are proposed. They show that the triton emission probability ( $t/B$ ) as well as the alpha emission probability ( $LRA/B$ ) after correction for alpha-clustering correlate fairly well with two parameters: the fissility parameter ( $Z^2/A$ ) and the average total fission neutron multiplicity ( $\langle\nu\rangle$ ). Nevertheless, these correlations are only valid if spontaneous fission data and neutron induced fission data are considered separately, suggesting that the excitation energy of the fissioning nucleus must be taken into account. In this way,  $t/B$  and  $LRA/B$  could be predicted for fissioning systems not investigated so far. Results obtained from this work will be included in the Fission Yields data file of the European library JEFF3.